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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,240	08/01/2006	Takashi Abe	5453-061931	8244
28389 7590 04/07/2009 THE WEBB LAW FIRM, P.C. 700 KOPPERS BUILDING 436 SEVENTH AVENUE PITTSBURGH, PA 15219				
EXAMINER				
ANGWIN, DAVID PATRICK				
ART UNIT		PAPER NUMBER		
3729				
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04/07/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/588,240

**Applicant(s)**

ABE ET AL.

**Examiner**

DAVID P. ANGIN

**Art Unit**

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 4 and 7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 4 and 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 1/23/09
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### **Continued Examination Under 37 CFR 1.114**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/23/09 has been entered.

### **Claim Rejections – 35 USC § 103**

The following is a quotation of 35 U.S.C. § 103(a) that forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically taught or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. § 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 1 and 3** are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Barber et al* (US Patent Publication 2002/0022292) in view of *Ikada et al* (US Patent 6,367,133), *Li et al* ("High Sensitive... and Melting Photoresist, 12<sup>th</sup> International Conference on Solid State Sensors," 6/8/03), *Aoki* (US Patent 5,646,657), and *Hwe et al* (US Patent Publication 2004/0016718).

- a. *Barber et al* discloses the following in his reference:
  - i. applying a masking agent to a surface of a piezoelectric material to form a film of the masking agent on the surface of the piezoelectric material (Figs. 3 and 7-9);
  - ii. patterning the film of the masking agent into a predetermined masking pattern (Fig. 3);
  - iii. holding the patterned film in contact with a vapor of a solvent (30:1-13) for the masking agent, so as to fluidize the film to a domed shape on the surface of the piezoelectric material (Figs. 3 and 7-9), wherein the vapor diluted with the inert gas is formed by bubbling the solvent with the inert gas (*the examiner notes that gas pockets or bubbles inherently occur when mixing a vapor with a gas*); and
  - iv. dry etching the piezoelectric material together with the cured film corresponding to thickness distribution of the domed shape (Figs. 3 and 7-9; 29:1-9).
- b. Regarding claim 1, in addition to the above limitations, *Barber et al* may not expressly disclose selectively applying an oil repellent to surface portions of the substrate which are not covered with the patterned film.
  - i. However, *Ikada et al* teaches in his reference selectively applying resist (Figs. 1A-F, items 5 and 6) and conductor films (items 4 and 7) to surface portions of the substrate which are not covered with

the patterned film (*the examiner notes that resist and metals are known to repel oil*). The advantage of selectively applying resist and conductors to surface portions of the substrate which are not covered with the patterned film is to form electrodes (items 1a and 2a). Therefore, it would have been obvious to selectively apply an oil repellent to surface portions of the substrate which are not covered with the patterned film to form electrodes.

- ii. In addition, *Aoki* teaches that the resist contains an oil repellent (4:4-15). The advantage including an oil repellent inside a resist is to prevent oil and oil-based liquids from entering the material surface and changing the etch rate of the piezoelectric material. Thus, it would have been obvious to treat the resist with an oil repellent to prevent oil and oil-based liquids from entering the material surface and change the etch rate of the piezoelectric material.
  - iii. Further, the examiner notes that the steps in this method – in particular, the step of “selectively applying an oil repellent to surface portions of the substrate which are not covered with the patterned film” - have not been given a precise order. Therefore, the examiner concludes that this step could occur after the “dry etching” step.
- c. Regarding claim 1, in addition to the above limitations, *Barber et al* may not expressly disclose a vapor solvent diluted with an inert gas.
- i. However, *Li et al* teaches in his reference a vapor solvent diluted with an inert gas (509:9-16). The advantage of utilizing a vapor solvent diluted with an inert gas is to take advantage of a known and effective method to melt resist. Therefore, it would have been obvious to utilize a vapor solvent diluted with an inert gas to take advantage of a known and effective method to melt resist.
- d. Regarding claim 1, in addition to the above limitations, *Barber et al* may not expressly disclose curing the dome-shaped film.

- i. However, *Hwu et al* teaches curing the dome-shaped film. The advantage of curing the dome-shaped film is to stabilize the film. Therefore, it would have been obvious to cure the dome-shaped film to stabilize the film.

**Claim 4** is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Barber et al* (US Patent Publication 2002/0022292) in view of *Ikada et al* (US Patent 6,367,133), *Li et al* ("High Sensitive... and Melting Photoresist, 12<sup>th</sup> International Conference on Solid State Sensors," 6/8/03), *Aoki* (US Patent 5,646,657), and *Hwe et al* (US Patent Publication 2004/0016718) and further in view of *Hladovcak et al* (US Patent 4,487,828).

- a. Regarding claim 4, in addition to the limitations in claim 3, *Barber et al* as modified may not expressly disclose that the dome-shaped film is cured by UV irradiation.
- i. However, *Hladovcak et al* teaches curing a resist by UV irradiation (2:13-21). The advantage of curing a resist by UV irradiation is to utilize a well known process to harden and stabilize a resist. Therefore, it would have been obvious to cure a resist by UV irradiation to utilize a well known process to harden and stabilize a resist.

**Claim 7** is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Barber et al* (US Patent Publication 2002/0022292) in view of *Ikada et al* (US Patent 6,367,133), *Li et al* ("High Sensitive... and Melting Photoresist, 12<sup>th</sup> International Conference on Solid State Sensors," 6/8/03), *Aoki* (US Patent 5,646,657), and *Hwe et al* (US Patent Publication 2004/0016718) and further in view of *Kim et al* (US Patent 6,530,652).

- a. Regarding claim 7, in addition to the limitations in claim 3, *Barber et al* as modified may not expressly disclose that the dry etching is conducted by using a perfluorocarbon, chlorine, or iodide gas.
- i. However, *Kim et al* teaches dry etching is conducted by using chlorine gas (7:17-22). The advantage of dry etching by using chlorine gas is to utilize a well known process to remove material. Therefore, it would have been obvious to dry etch by using chlorine gas to utilize a well known process to remove material.

### **Response to Arguments**

Applicant's arguments with respect to claim 1/23/09 have been considered but are moot in view of the new ground(s) of rejection.

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David P. Angwin whose telephone number is 571-270-3735. The examiner can normally be reached on 7:30 AM - 5 PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant, can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. Dexter Tugbang/  
Primary Examiner  
Art Unit 3729

DPA  
April 2, 2009